

Enthalpy  $\Delta H$

Entropy  $\Delta S$

Gibbs Free Energy  $\Delta G$

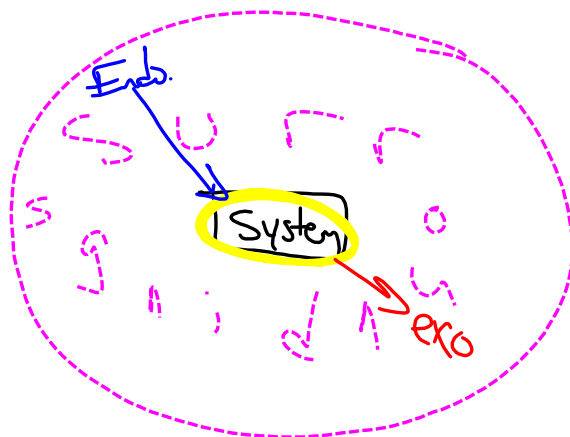
Thermo ① Heat is work + work is heat.

② Heat. **HOT**  $\rightarrow$  **COLD**  $\ominus \Delta H$

Hot (more Energy)

Spontaneous = Loss of heat energy

cold (less energy)



Endothermic  
heat enters

Exothermic  
heat exits

# 3 ways Transfer heat

① Conduction → Touching

② Convection → breeze, (oars)

③ Radiation → Sunshine, X-Ray

PE (Ability)  
Stored

$$PE = m \cdot g \cdot h$$

mass (kg)      gravitational acceleration ( $\frac{m}{sec^2}$ )      height ( $\frac{m}{1}$ )

$$J = \frac{kg \cdot m^2}{sec^2}$$

KE (Motion)

$$KE = \frac{1}{2} m v^2$$

mass      velocity

$$J = \left( \frac{kg}{1} \right) \left( \frac{m^2}{sec^2} \right)$$

$$J = \frac{kg \cdot m^2}{sec^2}$$

